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## THE CHIGNON FUNGUS.

BY TILBURY FOX, M. D.

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NOTHING could more clearly have shown the amount of ignorance of the natural history of minute life abroad amongst the public, and the little trouble people will take to make the most trivial use of their common sense, when a novelty, embellished by plausible description, is presented to them, than the rampant nonsense which has been penned and believed in regard to the so-called gregarinæ infesting certain varieties of false hair. The "chignon controversy" has been one of the most widespread, but at the same time transient sensations of the age: started abroad, it soon reached England, where it bewildered the fashion worshippers of the day. The immediate cause of this hubbub was the appearance in the Hamburg paper *Der Freischütz*, of the 7th of February, 1867, of an article based upon the account given in the "Archiv der Gerichtlich Medicin und Hygiene," and in which we are informed that "Mr. Lindemann professes to have discovered and observed a new microscopical parasite, to which he has given the name of Gregarine. He reports, according to his observations, that the gregarine—a protozoic animalcule—is of the lowest order of development of the animal organism, and is found parasitically within the animal and human body, where it floats about with the blood, by which it is nourished. The most striking instance of the parasitism of the gregarine is said to be its existence on the human hair. The gregarinous hair, however, differs in no way from the sound hair. Only if one looks very closely, little dark brown knots, which are generally at the free end of the hair,

may be distinguished even with the naked eye. These are gregarines. Out of thirty samples of hair procured from a hairdresser in Nishni Novgorod, gregarines were found in seventy-five per cent. And it is well known that the hair used for the chignons of the better half of Russia is bought of the poor peasant women, who are proverbially of dirty habits. Pursuing his inquiry, Mr. Lindemann has discovered that almost every louse has in its interior an enormous number of gregarines, and he convinced himself by further experiments that the gregarines on the human hair are deposited there by lice. He observes that the most favorable conditions for the growth of gregarinæ are light, increased temperature, and a moist atmosphere; and he declares that in the ballroom these are not without their influence on the parasites when they exist on false hair, for they at once revive, grow, and multiply, get disseminated in millions, and in consequence of the increased respiration produced by the exertion of dancing, are inhaled freely into the lungs, reach their specific gregarine nature, and after a while induce disease in the body."

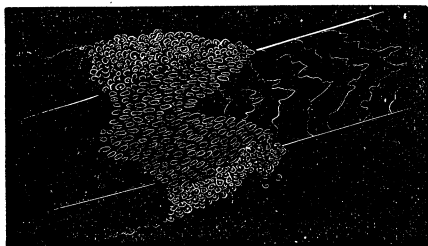
In these quotations prevalent fashions were depicted as sources of danger, inducing discomfort and disease. A writer in one of the daily papers ("Investigator") asserted that he had witnessed from direct observation the development of gregarine into lice, an assumption that implies a liberty with Darwinism that its most zealous and radical devotees would at the present time hesitate to suggest. It is only just to say that the *Lancet*, which first noticed the matter, and confined itself to a mere mention of the facts, urged its readers to accept the statements put forth, with the gravest caution. Lindemann's assertions are very startling to scientific men, because

they are wholly in antagonism with observed facts. Whilst scientific research has as yet afforded little insight of the habits of the lower forms of animal and vegetable life, the revelations of the microscope within the last few years are pregnant with significance as regards their ubiquity, and teach us that we are not to be astonished if we find living forms in unexpected sites, undergoing the most manifold variations in aspect when brought under the play of different influences. At the same time we have the amplest experience to caution us against the acceptance of new species without the keenest criticism. What, then, is the truth in this matter? In my devotion to the subject of diseases of the skin, it has lain in my way during the last ten years to investigate the whole subject of diseases of the hair connected with the development of vegetable parasites, and I think no one has made a larger number of microscopic observations. I have never seen a true gregarina in connection with the hair; but I have recently found a vegetable growth on false German hair answering in naked eye appearances to that described by Lindemann as little dark specks surrounding the hair towards its end. Gregarinæ, according to Lindemann, are made up of cells, which he states to be vegetable, and it is possible that that which I have found may be identical with his gregarinæ. I cannot help thinking that many bodies totally dissimilar in nature have been classed with gregarinæ, which my friend Ray Lankester, than whom no higher authority on the point exists, declares to be truly animal. The growth I have found I now proceed to describe.

If you take a hair on which the parasite exists, and hold it between yourself and the light, towards the outer half you will see one or more, perhaps half a dozen, little dark

knots the size of pin-points, surrounding the shaft of the hair; they are readily felt on drawing the hair through the fingers; they are somewhat difficult to detach. If a hair be placed under the microscope with a quarter-inch objective, the mass will be seen to be made up of cellular bodies surrounding the hair, such as are seen in Fig. 1,

Fig. 1.



kindly drawn for me by Dr. Braxton Hicks, F. R. S.

It will be seen that the mass has the appearance of a fungus growth, of which two distinct forms are here

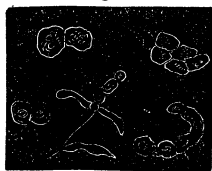
present, viz., *mycelial* or *filamentous*, seen in the central part of Fig. 1; and *sporular* or *cellular*, seen in Fig. 2, which is the outer part of Fig. 1.

The hair is apparently healthy, and if the slide be pressed the mass will break away from the hair on either side, bringing away with it more or less of the cuticle, and leaving behind a healthy shaft. The cells are seen to be of various shapes and sizes. Fig. 3 gives a good representation of them; they are from  $\frac{1}{3000}$  to  $\frac{1}{4000}$  inch; many are like the torula cells developed from *Penicillium*. Others are larger, undergoing division very actively; they may be subdivided into two, three, or four parts, or much more freely. This indicates the assumption by the parasite of an algal condition. In watching the mass on the hair carefully, it is evident that

Fig. 2.

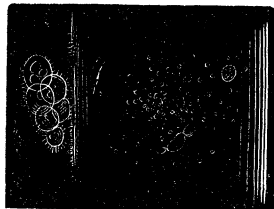


Fig. 3.



a number of cells become detached from the outer or sporular form, and at once move actively about. These small cells indicate an active growth by subdivision, and a fruitful source of propagation; they subsequently become the cells seen in Fig. 3. Certainly this variety of fungus so far described is the most active growth I have come across in my researches, and I have been enabled to germinate it most successfully, so as to set all questions as to its nature completely at rest. Placed under favorable circumstances in water, the spores (Fig. 3) enlarge considerably, and the mycelial filaments increase also; but there is at this time to be observed a very remarkable occurrence, though not in all cases. Some of the large cells in Fig. 1, have become filled with smaller cells; and in others, in addition to these, processes have been put forth from the circumference of the walls in a radiating manner; in other cases the enlarged cells have two long cilia attached to them, by which they move about rapidly, whilst a part of the hair, previous to this free from the fungus, has become dotted all over by minute cells similar to those seen in the interior of the larger ones. All this is seen in Fig. 4.

Fig. 4.

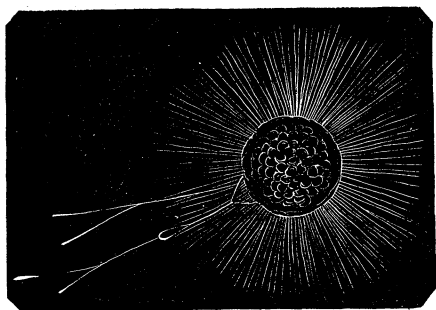


But more than this, I have observed most distinctly large cells filled with smaller cells, furnished with exceedingly delicate radiating processes and putting forth pseudopodia. One of these cells of large size is represented in Fig. 5.

It will here be seen to have assumed the features of an amœboid body. Nothing could have been more distinct to myself, and those who were observing with me, than

this peculiar form; and it seems to me that we have here a pretty complete history of the life of this fungus,—namely, the sporular subdividing and assuming an algal

Fig. 5.



form, which in turn becomes a mœbi-form, and furnishes ciliated cells that supply the earliest condition of the fungus, as seen in Fig. 4, scattered over the hair.

But not satisfied with these results,

I set to work to grow the fungus in sugar and water, under constant observation. A rapid enlargement of the sporular cells took place, as in the former case, and in some of the larger cells the most distinct circulation of the granules around the inner circumference of the parent cell was witnessed by myself and my friends, and a beautiful object it was. Finally, I obtained a result similar to the former one.

Fig. 6 represents the appearance of the fungus at the end of fourteen days, seen with an  $\frac{1}{2}$  inch object-glass.

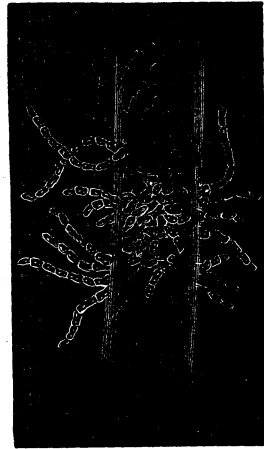
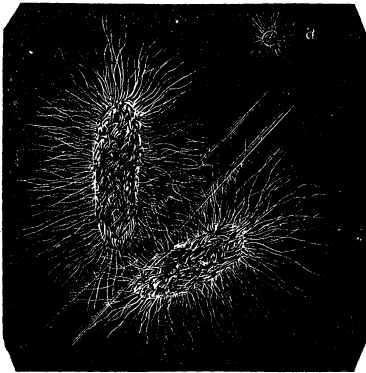
Fig. 7 is a portion of the mycelium, taken from the part over the hair, more highly magnified with a 1-12th object-glass.

The ends of the filaments seen in Fig. 8 are analogous, in fact identical with those forms which I have figured in my work on *parasitic diseases of the skin* as resulting from the growth of *oidium*. The globose head contains spores, and is an early stage. The double cell figured in the centre was of a green color like many others.

Accompanying these appearances were, as in the former case, cells—filled with smaller cells and granules in ac-

Fig. 7.

Fig. 6.



tive motion—furnished with cilia, and bodies undergoing the "amoeboid" transformation, as seen in Figs. 9 and 10, with 1-12 inch Powell and Lealand.

Here, again, we have the growth taking on an algal

Fig. 9.

Fig. 8.

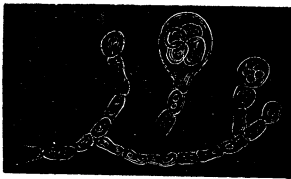


Fig. 10.

phase in one direction, and fructifying into a perfect fungus on the other hand. The drawings I have given were made on the spot from the microscopic objects, and I



must do the artist credit to say he has most faithfully and cleverly portrayed the actual appearances presented by the parasite. The observations now recorded are in complete harmony with those of Dr. Braxton Hicks on the Volvox, and De Bary in his work published in 1864, at Leipsic, "Die Mycetozen, Ein Beitrag zur Kenntniss Der Neidersten Organismen," and are completely confirmatory of the opinion before advanced by myself, that the fungi found upon or within man belong to one genus, and undergo an infinity of variations under different circumstances. In the present case the fungus approaches to the character of *Torula* rather than any other. There are many most interesting questions that cannot be discussed here. The only one I need refer to is the influence which this species of parasite has in the production of disease. In the immediate condition in which we find it on the hair it need cause but little anxiety; but the minute form as seen in Fig. 4, transplanted to a suitable soil—and the scalp of delicate children best furnishes it—would produce disease of the scalp: of that I have no doubt. Luckily, the tissues of adults, namely, those who wear chignons, are not prone to the more severe forms of diseases produced by vegetable parasites; and as the mass of false hair used in England is free from the fungus described above, the total danger, on the whole, is slight. —*Hardwicke's Science-Gossip*.

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NOTE.—*Torula*, *Penicillium*, and *Oidium* are microscopic genera of fungi. The word algal is derived from *alga*, a sea-weed, of which there are many minute species. *Pseudopodia* is derived from the Greek, meaning "false-feet;" they are the organs of locomotion, being mere extensions of the side, or walls of the body of Infusoria. In Fig. 5 they radiate like hairs from the body of the plant. *Amæba* is a low Infusorium, or Rhizopod.